15 September 1965

Bud:

Although I wrote this some time ago from a particular viewpoint, the basic idea may still be useful. I would especially recommend consideration at this time of a Design Review of the compatibility of the CORONA design with NPIC capabilities and their data handling procedures. This would effect some wedding between picture takers and the picture viewers; would be helpful in our relationships with NPIC and DDI; and could be cited by you as concrete evidence of action on your part in response to the Inspector General's paper. The Chairman for such a review, which should not take more than 5 or 10 days, could be [redacted] 25X1A
25X1A [redacted] or [redacted] etc., and 25X1A
include membership from Crowley's group, NPIC, ORD, OCS. Consideration might be given to offering Dr. Flax an opportunity to provide a member or observer.

Would you like me to sound Crowley and NPIC on this?

25X1A [redacted]

Ray 15 Nov 65
Let's hold till the NRO
ceases to boil so hard —
then reraise — Bud

[redacted] 25X1A

Copy 1 of 6.

24 August 1965

MEMORANDUM FOR: Deputy Director for Science and Technology

SUBJECT: DD/S&T Initiative to Assist NPIC

1. I have read the Inspector General's report on NPIC and the NPIC White Paper, and have had some discussions with Mr. Borel. It is apparent that DD/S&T is partially responsible for many of NPIC's problems, and I recommend DD/S&T initiative in taking steps now to preclude the perpetuation of the presently unsatisfactory operating relationships, and improve the existing situation.

2. In several places in his report, the Inspector General critically cites the lack of integrated management and design in the collection and exploitation systems. These appear in Appendix A. NPIC does not point the finger quite so clearly, but they do recognize the problem as indicated by the extracts from their White Paper, which appear in Appendix B.

3. I have informally discussed with [redacted] the desirability 25X1A
of implementing a Program Review Board comprised of Director, OSA; Director, SPS; and myself as permanent members, with representation from NPIC and/or NSA, OEL, DOD, and other organizations, as appropriate. Such a board, with program approval authority for programs involving an expenditure [redacted] can insure that 25X1A
systems integration is achieved to the maximum extent possible.

4. In addition to the Program Review Board, I propose the use of Design Reviews, when appropriate, to make detailed examinations of systems, or to investigate particular areas within systems, as appropriate, to insure that the best possible configuration is achieved. A suitable charter for such Design Review Boards is attached as Appendix C.

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HANDLE VIA COMINT
CONTROL SYSTEM ONLY

[redacted]

HANDLE VIA [redacted] TALENT KEYHOLE 25X1A
CONTROL SYSTEMS JOINTLY

5. I would like to discuss the details of implementation of these recommended actions with you with the objective that DD/S&T can then make suitable recommendations to DCI, NPIC, Inspector General, NRO, and possibly NSA and others to obtain wide co-operation in solving this basic problem of system integration, and establish the definite and tangible steps which will be taken. 25X1A

[redacted]

Attachments:
1 - Appendix A
2 - Appendix B
3 - Appendix C

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HANDLE VIA
[redacted] TALENT-KEYHOLE 25X1A
CONTROL SYSTEMS JOINTLY

APPENDIX A.

Extracts from "Inspector General's Survey of the National Photographic Interpretation Center - June 1965"

25X1A [redacted]

(Underlining is all mine)

Page 2, para. 6.

"It appears to us that the breakthrough needed to materially cut the human hours spent in photo-interpretation, if breakthrough is in fact possible, will be found in vastly improving the integration of collection systems design with photo-interpretation techniques. Because this is a highly technical field, there would be much to be gained from a cost disciplinary examination of photo-interpretation technology and procedures by a panel of competent consultants."

Page 3, para. 4.

"United States photographic systems development is currently, and very belatedly, entering the era of integrated systems design. The key principle, now increasingly appreciated, is that no element of the collection device may be varied without significant impact on many other elements of the total collection/exploitation design concept. .....the effort has achieved a significant capability to conduct repetitive search and identification of activity in denied areas, and is now moving rapidly into an era of continuing surveillance and analysis of change in known targets."

Page 30. 25X1D

[redacted]

Page 37.

"NPIC cannot demand that design details of planned collection systems be divulged to it while systems are in development. Much of its knowledge of oncoming systems is acquired through informal and

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[redacted]

[redacted]

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APPENDIX A (continued)

unofficial liaison with acquaintances in government and in industry. We think it is time to elevate the problems of exploitation to consideration at the USIB level commensurate with the attention given to collection scheduling."

Page 40, para. 1.

"One of the principal conclusions of the present, as of the 1962, inspection of NPIC has been that the exploitation or photo-interpretation function requires full and equal representation at the planning table in the design of photographic reconnaissance systems."

Page 40, para. 2.

"While the record on cooperation between collectors and exploiters of photography is neither purely black nor purely white, (see para. 3 below), it nevertheless strongly reflects compartmentation, unilateral management actions, and a lack of adequate appreciation of the fundamental requirements of photo-interpretation on the part of systems designers and systems operators."

Page 41.

".....the National Reconnaissance Office has maintained since 1960 a Configuration Control Board (CCB), and a sub-committee designated originally as the Systems Engineering and Technical Committee, now known as the Systems Engineering Committee (SEC). NPIC has had regular representation on the SEC Committee but its activities have become irregular in the past year, and there have been no meetings since January 1965. It is credited by NPIC with having done useful work in securing systems modifications that better satisfy NPIC needs but, again, after the given systems have become operational."

Page 45, para. 6.

"The inspectors accumulated considerable evidence of failure on the part of systems designers and operators to take exploitation problems into account. These failures run the gamut from faulty design of performance measuring devices, omissions of equipment, lack of investigation of significant problems, inadequate communication, to inadequate management arrangements."

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APPENDIX A (continued)

Page 49.

"There is no provision for the designation and accreditation of NPIC systems teams to work with their opposites in industry, in the NRO/DOD, nor in the DD/S&T of CIA. There is no planning and programming mechanism which establishes and executes projects and employs PERT-type controls to insure that all decisions are effectively scheduled and coordinated."

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[redacted]

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[redacted]

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APPENDIX B.

25X1A

Extracts from NPIC White Paper - TCS-8896/65
June 1965

Page 10.

"Furthermore, it has had no control over the collection resources so that they might be tailored to enhance and speed up the exploitation process."

25X1A

"There seems little sense in, on the one hand, spending literally [redacted] for the collection of photography from both satellite and manned aircraft systems, and at the same time giving relatively little attention to the exploitation facilities which must handle the inputs if they are to have meaning to the Intelligence Community. Proportionate attention must be given to the exploitation side of the reconnaissance picture. At the least, a much higher degree of coordination between both sides of the program must take place; at best, quite possibly a single authority over both national collection and exploitation should be established."

APPENDIX C.

S-E-C-R-E-T

OFFICE OF ELINT

ORGANIZATION

NOTICE
OEL 1-2
22 June 1964

DESIGN REVIEW BOARD

1. The Design Review Board procedure is established to provide a simple, uniform process by which OEL programs may be scrutinized from time to time. Since the scope of OEL programs is broad, the review procedure is designed to be very flexible in order to assure its effectiveness. The procedure is equally adaptable for reviews involving only a few people for a few hours in the case of simple projects as it is for reviewing complex projects which may require several days and the use of larger committees.

2. While comprehensive in scope, it is intended to be helpful rather than burdensome, and the frequency and depth of the review will be largely dictated by the complexity of the equipment or system involved.

3. Initiation of this procedure will be as of this date. While design reviews of all equipment under development by OEL cannot be undertaken simultaneously, each Project Officer should note his responsibilities as delineated in the attachment and take action to schedule appropriate reviews at an early date.

[redacted]

GEORGE C. MILLER
Assistant Director for ELINT

Attachment:
Design Review Board Procedure

Distribution:
All Divisions

25X1A

TITLE:	Design Review Board Procedure
PURPOSE:	To present the procedures for instituting and conducting formal Design Reviews
SCOPE:	The provisions and instructions contained herein extend to all organization segments of OEL

GENERAL:

Nature:

1. The Design Review Board (hereinafter abbreviated DRB) has been instituted to insure maximum integrity and usefulness of equipment for which OEL is responsible.

Operating Method:

2. The operating method of the DRB is as follows:

2.1 A DRB schedule will be established by the Project Officer when an equipment development program/contract is initiated, unless specific approval is obtained from the AD/OEL to void this requirement.

2.2 The DAD/S&D, with the approval of the AD/OEL, will select the DRB Chairman.

2.3 The DRB Chairman will select the DRB Members, make the arrangements for the meeting, and conduct the review.

2.4 Within one week following conclusion of the review meeting(s), the DRB and the Project personnel will determine action to be taken on the DRB recommendations and will issue a memorandum stating the action.

Within three weeks following issue date of the memorandum, a final report will be issued.

2.5 Recommendations to be implemented will be handled through existing channels by the Project Officer.

PROCEDURE:

Summary: 1. Throughout the normal life cycle of equipment, there are times when a review of a particular aspect of the work (or the entire product) by an objective group of personnel and specialists in the particular field would be timely and beneficial. In addition to providing a fresh look at the project at a time that improvements can be readily implemented, the review serves the secondary purpose of increasing the technical background of the participants, and making actual experience available to other projects. A list of salient monitoring points, together with some of the factors to be considered in such reviews, are presented in Appendix A (attached). References 1, 2, 3, 4, 9, 10, and 20 in the Bibliography (attached) should prove particularly useful to review board members as sources for additional background.

In scheduling reviews, consideration must be given to the stage of product development (i.e. a period when development has progressed far enough to justify a review, and still be in a stage wherein recommended changes can be expeditiously incorporated).

In addition to the accepted review points indicated in Appendix A, other types of product reviews may be instituted as the need becomes apparent. These points include, but are not necessarily restricted to:

1.1 Product Testing Reviews

1.2 Product Problem Reviews

1.3 Production Cost Reviews

1.4 Specification Reviews

DRB Initiation: 2. Each Project Officer in S&D/OEL cognizant of equipment development is responsible for initiating a Design Review activity. This responsibility cannot be delegated. The type of reviews required, when and where such reviews will be held and other germane aspects relative to the effective use of this evaluation technique are all part of this basic responsibility.

In implementation of the above philosophy, each Project Officer will review the current position with respect to scheduling project reviews.

It is anticipated that each project will include in its schedule one or more formal reviews for major subsystems or systems.

Design Review Implementation: 3. Reviews will be initiated as follows:

3.1 Organization:

DAD/S&D will select a Review Board Chairman who will normally be selected from the DD/S&T organization. The Chairman, together with the designated project representative, shall establish mutually agreeable objectives and shall adopt a schedule and an agenda for the review. An informal memorandum shall be published formalizing the DRB meeting, and indicating the following:

3.1.1 The purpose and scope of the review;

3.1.2 The schedule of the review;

3.1.3 The location of the meeting;

3.1.4 All anticipated expenses of the review, including consultant fees, trips, man-hours, etc., with the appropriate project charge number;

3.1.5 The names of appointed meeting members;

3.1.6 The reports, prints, specifications, and other required documents;

3.1.7 The parts, components, subassemblies, assemblies, and other required hardware;

3.1.8 Requirements for consultants, vendor representatives, subcontractor representatives and military representatives shall be outlined;

3.1.9 A schedule for the delivery of documents and hardware before the meeting, if required;

3.1.10 Conditions, constraints, contingencies, or limitations bearing on the review;

3.1.11 Listing of applicable references;

3.1.12 Report distribution

Both the Project Officer and the DAD/S&D shall sign this memorandum indicating agreement with its planning and objectives.

3.2 Membership:

In addition to the Chairman, the DRB shall include, but is not necessarily limited to, representation as follows:

Representative	Appointed by
3.2.1 At least one member from the Project Officer's group, responsible for the presentation	Project Officer

3.2.2 Technical specialist(s) having required skills; other divisions or projects of the Agency having such skills may be invited as consultants.

3.2.3 Consultants from outside agencies may be invited if appropriate.

3.2.4 Vendor and subcontractor representatives may be invited if appropriate.

3.2.5 Military personnel may be invited when appropriate. It is important that the representatives appointed be technically qualified, but not so closely related to the product that an open viewpoint is precluded.

The Chairman will assure that all members of the DRB are properly notified and given adequate notice of the DRB meeting.

3.3 Schedule:

The DRB meeting(s) will be scheduled far enough in advance to permit adequate planning, thorough study of applicable documents, and ample time for consultants, subcontractors, and vendors to arrange their trips.

3.4 DRB Meeting Procedure:

The Chairman of the DRB shall formulate an agenda encompassing all of the agenda objectives and distribute it in advance of the meeting.

It is the responsibility of the Chairman to keep the meeting on schedule and to either act as, or appoint, a secretary to keep faithful records of the discussion and decisions. The secretary should list the names, addresses, and telephone extensions of the DRB members, and where possible, request that alternates be named.

The Chairman shall conduct the review to fulfill the specified objectives within the allocated time. If completion within the scheduled period is impossible, the meeting may be continued for an additional specified period with the oral approval of the DAD/S&D. The Chairman may recommend continuing action to satisfactorily complete the DRB business.

3.5 Critique:

At the conclusion of the review presentations, and within two working days, the DRB will formulate in writing its recommendations for presentation to be within the scope established by the initiating memorandum. The DRB members and the Project Officer will discuss and resolve the recommendations into the following categories within three working days:

3.5.1 To be implemented with approximate dates or effectivities;

3.5.2 Not to be implemented;

3.5.3 To be referred to the DAD/S&D and/or AD/OEL for resolution. The resolution results will be published by memorandum to the DAD/S&D. Items to be implemented will be issued by the Project Officer through normal channels.

3.6 Report:

3.6.1 A formal report will be prepared by the DRB, covering the salient points of the meeting, recommendations and resolutions. Appendix B (attached) shall be used as a guide in preparing the report. The following shall be included.

3.6.1.1 Title Page - should include the title, date, signatures, and titles of each of the DRB representatives. Signatures indicate acceptance of the report. Dissenting or alternate viewpoints may be included in the discussion section or in appendices.

3.6.1.2 Foreward - should note the project, contract number, the Engineering Directives establishing the review, etc.

3.6.1.3 Table of Contents

3.6.1.4 Summary

3.6.1.5 Introduction

3.6.1.6 Discussion - the body should include all pertinent board discussions, resolutions, findings, recommendations, and conclusions. Other data, such as equations, test data, photographs, graphs, and charts may be included where deemed necessary for report completeness. Generally, detailed mathematical formulas and calculations should be found in the appendix.

3.6.1.7 Conclusions

3.6.1.8 Recommendations

3.6.1.9 Appendices

3.6.2 Every effort should be made by the Chairman to complete the report within three weeks after conclusion of the DRB Critique. Sufficient copies should be prepared to supply one to each of the DRB members, two copies to the Project Officer, one to the AD/DAD/OEL, and one to DD/S&T. Appropriate security procedures shall be observed. Copies of reports will be issued only to eligible personnel through normal distribution channels.

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APPENDIX A

DESIGN AND DEVELOPMENT MONITORING POINTS

1. Monitoring Points

1.1 Design Concept Review

This phase starts with the contract award and culminates in a design report which includes studies of system and subsystem functions; schematics both electrical and mechanical; and in some cases physical layouts. There should be an overall system concept review to ascertain that the elements of the system are assigned the necessary and proper functions which will satisfy the use characteristics. Further, there may be a concept review of each system element to ascertain that its design will perform the assigned functions in the best possible manner. Of all the reviews which can be held, this is the most important and can have the most significant impact. It should be considered mandatory and omitted only in extreme cases.

1.2 Prototype Design Review

Here the initial system design is nearly complete, and many component parts and assemblies have undergone some developmental testing. Some of the factors to be considered at this review are:

Adherence to Specifications: This includes specifications at all levels.

Reliability: This is generally more easily measured quantitatively at the electrical review, but is nonetheless important in the mechanical review.

Safety of Personnel: Not only high-voltage killers, but also knuckle-nibbling burrs and sharp corners must be eliminated.

Appearance and Human-Engineering Factors: Equipment should be appropriately proportioned, and should "fit" people.

Economy of Manufacture: Value engineering factors are becoming more vital. For example, producing an expensive design and then changing it to something more economical may provide impressive "savings" on a monthly report; however, the design review can assure design economy from the outset.

Environmental Adequacy: The equipment should be designed to survive dust, heat, vibration, corrosion, fungus, shipping, and other natural and human outrages to which it will be subject.

Maintainability: The maintenance philosophy of each assembly, as well as that of the whole system, must be known and applied from the outset.

Compatibility: As systems grow in size and complexity, the problem of fitting the components together also grows.

1.3 Prototype Demonstration (Hardware) Review

The first complete sets of hardware and/or major subsystem hardware items are available at this point and can be assembled into the general physical configuration that they will have when used. Laboratory testing has been conducted to demonstrate the compatibility of system and subsystems. Special test-vehicle flights to obtain data for design improvement are being performed. During this phase, all necessary research and engineering data are obtained and the basic design firmly established. This review should place special emphasis on ascertaining the compliance with specification performance and military characteristics. Items to be stressed are assembly and field problems arising from the initial bringing together of system elements.

1.4 Production Design Review

At this point, the production design of the system is essentially complete and the system is considered ready for production. This review should place special emphasis on attaining minimum costs for the weapon system. It should include value analysis inputs for the deliverable hardware and should not ignore the more remote costs (aircraft, pilot training, fuel, etc.).

1.5 Demonstration of Service Readiness

Here the contractor or OEL is required to show that the system which is usually built under a limited or pilot-production program has reached the reliability objectives, that the system can be produced without significant loss in performance or reliability. Depending upon the individual program schedule, this review may be combined with the Production Design Review (Paragraph 1.4).

1.6 Service Evaluation

During this phase, the actual user personnel perform their own equipment evaluation tests. If the system is found to be operationally acceptable and is capable of being produced in quantity without significant loss in reliability or performance, approval of production for service use is usually given at this monitoring point.

1.7 Full-Scale Production

The primary aim at this stage is to ensure that the level of reliability designed into the system is maintained during production.

1.8 Demonstration of Major Product Improvement

At this point, the reliability and overall value of major product improvements are demonstrated and may be approved for incorporation into the weapon system.

2.0 Types of Investigations

There are several types of investigations which might be applicable to a system, subsystem, assembly, or part. Some of these types of investigations might be beneficially combined where the board members are experts in more than one field. Listed below are examples of the kind of reviews recommended (not in order of priority).

a. Reliability

b. Cost

c. Environmental Design

d. Maintainability

e. Human Engineering

f. System Concept

g. Producibility

h. Quality

i. Test Philosophy

j. Installation

k. Electrical

l. Mechanical

m. Thermal

n. Safety

o. Standardization

APPENDIX B

INFORMATION FOR PRODUCT REVIEW DOCUMENTATION

1. Equipment Identification

   Identify (a) system, subsystem, etc., (b) phase of work that has been completed, i.e., final prototype; (c) technical scope of review, i.e., circuit design, etc.

2. Review Board Membership

   Identify Chairman, functional departments, project technical specialist representatives. Indicate mandatory members, i.e., reliability specialist.

3. Associated Documents List

   Identify pertinent specifications and reports.

4. Time-Phased Program Chart

   List recognizable development steps and dates. Include all test plans and design review dates.

5. System Integration Requirements

   Include power inputs and required performance parameters. Discuss functions of equipment relative to system, list environments that affect performance and reliability.

6. Circuit Design Evaluation

   Discuss relation of proposed to previous designs. Discuss alternate designs that have been considered.

7. Packaging Design Evolution

   Discuss general construction and layout plan and relate to previous designs. Include weights estimates, sizes, structural materials, etc.

8. Design Analysis

   Include calculations and test data that demonstrate that the design will meet the system requirements.

9. Reliability Calculations

Complete standard stress analysis and prediction. Use summary sheets in accordance with RADC-TN-58-18. Include reasons for predicting failure rates different from past experience data.

10. Parts and Processes

Discuss significant part types, include all non-standard parts and those for which failure rate data is not available. Discuss all procedures that are novel or for which effective and product inspections are not possible.

11. Manufacturing and User Problems

Discuss human factors and machine availability. Evaluate problems due to novel features, difficulty of access, extreme tolerances, etc.